# CURRENT PASSAGE MECHANISM OF THE AUXILIARY GLOW DISCHARGE IN THE TRIGGER UNIT OF A COLD-CATHODE THYRATRON

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The report deals with the investigation of the low-current glow discharge with a hollow cathode and hollow anode in the trigger unit of a cold-cathode thyratron. Two discharge regimes were observed: the so-called hindered glow discharge and the conventional glow discharge. A model of the current sustainment in a hollow-cathode discharge is proposed. Instead of the conventional secondary emission coefficient, the model uses a generalized emission coefficient that takes into account not only ion bombardment of the cathode, but also the emission current from an external source. The results of calculations agree well with the experimental data.

Since the end of 1980s, considerable interest has been generated to a new type of low-pressure high-current switching device with a cold cathode (the pseudospark switch) [1–5]. A range of operating pressures of the switch corresponds to the conditions of the left branch of Paschen's curve when the electron free path for ionization is much in excess of the electrode separation. For both self-breakdown of the main gap of the switch and for external discharge triggering a considerable prebreakdown electron current is required [2, 4]. This current is provided due to a trigger unit that is placed in the main cathode cavity [3].

Various types of the trigger units are used in the switches [2, 3]. One type of the trigger devices is based on an auxiliary low-current hollow-cathode glow discharge. The conditions of the auxiliary discharge burning significantly determine the rating characteristics of the switch itself. Therefore, the investigations of the auxiliary discharge seem to be of a great importance.

In this report, the data on the regimes of the auxiliary glow discharge with a hollow cathode and hollow anode are presented. The model for current sustaining in hollow-cathode discharge has been developed. The model interprets well the current-voltage characteristics.

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